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EXAMINER	
CROWELL, ANNA M	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/032,279	DHINDSA ET AL.
	Examiner	Art Unit
	Michelle Crowell	1763

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21,23-25,27-36,38-51 and 66-75* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21,23-25,27-36,38-51 and 66-75* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. It is noted that claims 1-20, 22, 26, 37, and 52-65 are cancelled.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 44-51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 44 recites the limitation, "a third electrode **entirely in the region**" which is considered new matter. As seen in Figure 1, none of the electrodes, 20, 22, 29, 34 are located entirely in the plasma region 38; however, partial surfaces of the electrodes are located in the plasma region 38.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 21, 23-25, 27-36, 38-43, and 66-75 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 21, 29-30, 33, and 40-41 recite the limitation "the another electrode". There is insufficient antecedent basis for this limitation in the claim. Examiner suggests, "the **first** electrode".

7. Claims 24, 27-30, 33, 35, 38-41 recite the limitation, "the electrode" which is unclear since two electrodes are recited in the base claims. Examiner suggests, "the **second** electrode".

8. Claims 27-30 and 38-40 recite the limitation, "the excitation region geometry" which is unclear. It is unclear how the geometry relates to the current flow. In addition, it is unclear what structure is required to achieve the claimed geometry.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 21, 23-25, 27-31, 33-36, 38-42, 44-48, 66, and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. 6,178,919) in view of Lenz (U.S. 5,998,932).

Referring to Figure 3 and column 4, line 46-column 5, line 51, Li et al. discloses a vacuum plasma chamber 202 for processing a workpiece 214, the chamber including: a first electrode 204 for electrical coupling with gas in the chamber and for connection to a first relatively high frequency RF source 206 (col. 4, lines 53-56), a second electrode 210 for carrying the workpiece and electrical coupling with the gas in the chamber and for connection to a second relatively low frequency RF source 212 (col. 4, lines 62-65), an exterior wall 202 at a reference potential (col. 4, lines 51-53), and plasma excitation region 228 for confining the plasma, the region being spaced from the exterior wall, wherein the plasma excitation region including louvers 220, 222 connected to the reference potential and spaced from the wall, the plasma excitation region being arranged so that the gas flows into the plasma excitation region through the another electrode 206 and out of the plasma excitation region between the louvers 222 (col. 5, lines 13-31).

Li et al. fails to teach first and second surfaces at a reference potential.

Referring to column 4, line 61-column 5, line 17, Lenz teaches a plasma processing apparatus using surfaces 304a and 304b at a reference potential to eliminate or reduce unconfined plasma and thereby improve process control (col. 4, lines 8-13). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide first and

second surfaces of Li et al. with a reference potential as taught by Lenz in order to eliminate or reduce unconfined plasma and thereby improve process control.

With respect to claims 23 and 34, the chamber of Li et al. further includes that the plasma excitation region is bounded by the electrodes 204, 210 and louvers 220, 222 (see Fig. 3).

With respect to claims 24 and 35, the chamber of Li et al. further includes that the plasma excitation region is symmetrical with respect to the chamber exterior wall 202 and a center point on the electrode 210 for carrying the workpiece (see Fig. 3).

With respect to claims 25 and 36, the chamber of Li et al. further includes that the plasma excitation region is arranged so that the spacing between the electrodes 204, 210 can be changed at will (col. 5, lines 36-44).

With respect to claims 27-30 and 38-41, the apparatus of Li et al. in view of Lenz includes the structure of an electrode for carrying the workpiece, first electrode, and first and second surfaces at a reference potential, and therefore the apparatus is capable of performing the intended operations.

With respect to claims 31 and 42, the chamber of Li et al. further includes a processor including the first and second RF sources 206, 212, the first RF source 206 being connected to the first electrode 204, the second RF source 212 being connected to the second electrode 210 (col. 4, lines 53-54, col. 4, lines 62-64).

With respect to claim 44, the chamber of Li et al. further includes a third electrode 222 connected to a reference potential inside a plasma excitation region (see Fig. 3).

With respect to claim 45, the chamber of Li et al. further includes that the excitation region 228 and a chamber wall 202 are substantially isolated from each other by a plasma confinement arrangement 220, 222 (col. 5, lines 32-36).

With respect to claim 46, the chamber of Li et al. further includes that the confinement arrangement 220,222 includes an arrangement for passing the gas from inside the excitation region to outside the excitation region for affecting the gas pressure in the region (col. 6, line 39-col. 7, line 17, esp. col. 7, lines 7-17).

With respect to claim 47, the chamber of Li et al. further includes that the excitation region includes a louver arrangement 220, 222 for substantially confining the plasma to the region (col. 5, lines 32-36).

With respect to claims 48, 66, and 70 the chamber of Li et al. further includes louvers 222 of the louver arrangement have high electrical conductivity and are at the reference potential (col. 5, lines 17-19).

12. Claims 32 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. 6,178,919) in view of Lenz (U.S. 5,998,932) as applied to claims 21, 23-25, 27-31, 33-36, 38-42, and 44-48 above, and further in view of Nakano et al. (U.S. 6,270,618).

The teachings of Li et al. in view of Lenz have been discussed above.

Li et al. in view of Lenz fails to teach a filter arrangement wherein the current from the second RF source flows to the first and second electrodes.

Referring to Figure 1 and column 3, lines 30-59, Nakano et al. teaches a plasma processing apparatus having a filter arrangement 61a and 61b wherein the current from the

second RF source flows to the first and second electrodes. This filter arrangement traps plasma between the electrodes 4 and 8. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the filter arrangement of Li et al. in view of Lenz with the capability of flowing current from the second RF source to the first and second electrodes as taught by Nakano et al. in order to efficiently trap plasma between the electrodes.

13. Claims 49-51, 67-69, and 71-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. 6,178,919) in view of Lenz (U.S. 5,998,932) as applied to claims 21, 23-25, 27-31, 33-36, 38-42, and 44-48 above, and further in view of Lenz et al. (U.S. 5,534,751).

The teachings of Li et al. in view of Lenz have been discussed above.

Li et al. in view of Lenz fails to teach a pair of louvers for mechanical confinement with adjustable spacing.

Referring to Figure 3 and column 4, lines 1-5, Li et al. discloses an electrically floating louver 202 which prevents the plasma from grounding through the chamber walls. Referring to Figure 1 and column 6, line 8-column 7, line 53, Lenz et al. teaches a louver arrangement with a pair of louvers 30 for mechanical confinement with adjustable spacing so that charged particles of the spent gases in the plasma exiting the interaction space are neutralized by the louvers as the gases exit through the spaces. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the louver arrangement of Li et al. in view of Lenz '932 with a pair of louvers for mechanical confinement with adjustable spacing as taught by

Lenz et al. '751 so that charged particles of the spent gases in the plasma exiting the interaction space are neutralized by the louvers as the gases exit through the spaces.

Response to Arguments

14. Applicant's arguments filed July 27, 2004 have been fully considered but they are not persuasive.

Applicant has argued that the "excitation region geometry' in combination with functional language is not vague and definite under 35 USC 122, #2. However, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429,1431-32 (Fed. Cir. 1997)). Furthermore, apparatus claims cover what a device is, not what a device does (Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original)). Thus, since apparatus claims are currently being prosecuted, the claims must be distinguished from the prior art in terms of structure rather than function. Moreover, it is still unclear to the Examiner what structure is required to achieve the claimed geometry.

Applicant has argued that the electrode portions 304(a) and 304(b) and rings 222 of Li et al. are not within the confinement region. It should be noted that in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the electrode portions 304(a) and 304(b) and rings 222 of Li et al. are within the confinement region) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification

are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, the applicant's plasma excitation region 38 is bounded by electrodes 22 and 34, conducting rings 21 and 29, insulator rings 24 and 32, and louver arrangement 41-43 (page 9, par. [29]). Since the louver arrangement 41-43 surrounds the plasma excitation region 38, the louver arrangement 41-43 is considered within the plasma excitation region 38. Similarly, as seen in Figure 3, Li et al.'s plasma region 228 is bounded by electrodes 204 and 210, louver arrangement 220, 222, focus ring 216, and silicon ring 218 (col. 5, lines 32-37). Thus, the louver arrangement 220, 222 surrounds the plasma excitation region 228 and is considered within the plasma excitation region 228. Additionally, as seen in Figure 3 '932, the plasma region is within the electrode portions 304(a) and 304(b) (see attached Figures 3 of Lenz' 932 and Li et al.).

Allowable Subject Matter

15. Claims 74-75 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter:

The prior art, either singly or in combinations, fails to anticipate or render obvious a vacuum plasma chamber comprising: a first electrode connected to a first RF source, a second electrode for carrying a workpiece and connected to a second RF source, an exterior wall at a reference potential, a plasma excitation region for confining plasma spaced from the exterior wall, louvers spaced from the wall, and first and second surfaces at a reference potential, the first surface being located between the louvers and the second electrode, and the second surface being

located between the louvers and the first electrode, wherein **the sum of the areas of the first and second surfaces is about two times the sum of the areas of the first and second electrodes.**

Conclusion

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC
10-06-04

P. Hassanzadeh
primary Examiner
AU 1763